SYNOPSIS

OF

PRACTICAL PERSPECTIVE,

LINEAL AND AERIAL.

BY

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"The rules of art are not the fetters of genius, they are fetters only to [illegible] impotence."

Sir Joshua Reynolds

LONDON:

PRINTED FOR THE AUTHOR,

AND SOLD BY

CARPENTER & SON, OLD BOND STREET; LONGMAN & CO. PATERNOSTER ROW; [illegible], ALLEN, & CO. LEADENHALL STREET; [illegible] & REDER, CORNHILL.

1829.

LONDON:
Printed by J. L. Cox, Great Queen Street,
Lincoln's-Inn Fields.

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Honourable United East-India Company,

THIS WORK

IS,

WITH DEFERENCE AND RESPECT,

DEDICATED,

BY THEIR

MOST OBEDIENT AND MOST HUMBLE SERVANT,

THE AUTHOR.

London, Jan. 1st, 1830.

PREFACE.

In the following work the Author has endeavoured to arrange a concise System of Perspective that may equally serve the Teacher and Pupil, omitting theoretical reasoning, and trusting for conviction to the plain demonstration of facts. Sir Joshua Reynolds observes, in his excellent Discourses on Painting, that "a degree of mechanical practice, odd as it may seem, must precede theory. The reason is, that if we wait till we are partly able to compre-

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hend the theory of art, too much of life will be past to permit us to acquire facility and power; something, therefore, must be done on trust, by mere imitation of given patterns, before the theory of art can be felt."

Nothwithstanding there are extant many valuable works on this science, very few are sufficiently free from irrelevant matter to enable the student to come immediately to the point required, *viz.* the simplest mode of working a question; and many have their plates on so small a scale, that however good they may be in other points, it is impossible

impossible to introduce the minuter details with any chance of perspicuity.

The Author has had the whole of his own diagrams engraved upon separate plates; thus obtaining undivided attention for each, by avoiding that great inconvenience which frequently occurs to the student, when more than one figure meets the eye at the same time.

Those subjects which have been borrowed from other writers are duly acknowledged, and arranged with a view to diminish, as much as possible, the size of the book.

In

In the plates, as well as in the text, the greatest care has been taken to avoid errors. Should any yet remain, it is hoped that the kindness of the reader will ascribe them to the mistakes that are almost unavoidable in a first edition.

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SYNOPSIS

OF

PRACTICAL PERSPECTIVE.

INTRODUCTION.

Perspective is the science by which we are enabled to represent upon a plane the perfect appearance of all visible objects, and may be divided into two parts: first, Lineal Perspective, regulating the forms of objects; second, Aerial Perspective, relating to their colours, lights, and shadows.

At what æra Perspective became an organized science it is difficult to conjecture; but we may safely infer, that the ancients knew sufficient of its principles, to aid them in the

the construction of scenery for their dramatic performances, from the statement of Vitruvius, although he is the only author who gives any positive information as to its antiquity. He mentions, in the preface to his seventh book, that when Æschylus was about to exhibit a tragedy, he gave instruction to Agatharcus for the preparation of the scenery.

Agatharcus commenced by writing a treatise on the subject, which he communicated to his disciples, Anaxagoras and Democritus, who treated the science more distinctly than had been done by Agatharcus. Their writings have shared the fate of many other valuable works, and are now unknown.

It is much to be regretted that Pliny should not have handed down to us what

was

was known on the subject in his own times, instead of the amusing, but doubtful anecdote, of the crows being so deceived by some paintings used in the plays given by Claudius Pulcher, that they attempted to perch upon the pictured roofs of the buildings in the scenes.

When we consider how far advanced the ancients were in geometry, in sculpture, in painting, and in architecture, we have every reason to believe that perspective was equally well understood by them; and it cannot be supposed that an art so essential to the perfection of painting should be neglected, at a time which displayed those splendid examples of human genius produced by the fostering patronage of Pericles.

The objections that the paintings discovered in the baths of Titus and at Rome

do

do not evince any great progress in the knowledge of perspective, is not more valid than a similar one would be, should future ages dispute the pictorial and perspective knowledge of the present day, on considering some specimens of papering or other decorations of houses, that might happen alone to escape for a long period the general ravages of time: nor can we presume that the works of many of the ancient artists would have been so extolled, or would have sold at such astonishing prices, had they not possessed much of the merit ascribed to them, or had they erred in the first principles of their art.

Amongst the oldest writers who have prescribed certain rules of perspective, we find Bartolomeo Bramantino of Milan, whose work is dated 1440; and Pietro del Borgo,

who

who adopted the correct idea of giving the representation of objects as seen upon a transparent tablet placed between the spectator and the object.

It is very probable that the system of Borgo (whose work is not extant) is the same that Serlio published in 1540, as the method used by Serlio is taken from Peruzzi of Sienna, who had attentively studied the writings of Borgo; and it is either to the latter, or to Peruzzi, that we are indebted for the discovery of points of distance, the use of which have been so elegantly exemplified in some of the diagrams of Jehan Cousin, the earliest French writer on this science; his first work is dated 1560. But it was not until about the commencement of the seventeenth century that those principles were elaborately explained by Guido Ubaldi,

upon which Dr. Brook Taylor afterwards founded his condensed work on perspective.*

Since the authors above mentioned, much has been written on this subject by geometricians and others. Many of them display great ability, but have little or no reference to its general application in painting; an art that has been classed by the illustrious of all ages amongst the most valuable of those that are termed elegant, and for its utility, certainly, worthy of the great encouragement that has been given to it by every enlightened nation.†

The

* The musical arrangement of colours by Dr. Brook Taylor, and his mode of mixing tints by finding their centres of gravity, as described in his work on perspective, we are of opinion will be found much too troublesome to be useful.

† The following extract from Carver's Travels in North America shews an adaptation of drawing to a serviceable purpose, scarcely to have been looked for amidst savages.—"When Carver went up the "Chippaway river, in his progress to the Lake Superior, his guide,

who

The principal beauties in painting depend much upon that intellectual relish or discernment

" who was a chief of the Chippaways, fearing that some party of
" the Naudowessies, with whom his nation are perpetually at war
" might fall in with them and do them some mischief before they
" could be apprized of Carver's presence in the party, took the
" following steps. He peeled the bark from a large tree, and with
" wood-coal mixed with bear's grease, made, in an uncouth but
" expressive manner, the figure of the town of the Ottagaumies.
" He then formed a man dressed in skins. by which he intended to
" represent a Naudowessie, with a line drawn from his mouth to
" that of a deer, the symbol of the Chippaways. After this he
" depicted a canoe as proceeding up the river, in which he placed a
" man sitting with a hat on: this figure was designed to represent
" an Englishman, or Carver himself; his French servant was drawn
" with a handkerchief tied round his head, and rowing the canoe.
" To these he added several other significant emblems, among which
" the pipe of peace appeared painted on the prow of the canoe.
" The meaning he intended to convey to his enemies, and which
" there is no doubt was perfectly intelligible to them, was, that one
" of the Chippaway chiefs had received a speech from some Naudo-
" wessie chiefs at the town of the Ottagaumies, desiring him to
" conduct the Englishman who had lately been among them up the
" Chippaway river; and that it was required that the Chippaway,
" notwithstanding he was an avowed enemy, should not be molested
" by them on his passage, as he had the care of a person whom they
" esteemed as one of their own nation."

ment called taste; a word difficult to define, but well understood by the mind in its cultivated state. Perhaps, with relation to painting, we may call it that power of the soul which produces the greatest effects, in a natural and graceful manner, by the least apparent exertion, the smallest number of agents, and those of the simplest qualities. Yet the finest taste is insufficient without a knowledge of the rules of art; and for the foundation of pictorial skill, as well as for the formation of a correct judgment, an acquaintance with perspective is absolutely essential: in short, a composition in writing orthographically incorrect, would not be more faulty than a drawing in which the rules of perspective have been transgressed.

It is not unfrequent to see objects in drawings so defective, that what should ap-

pear

pear a large house, becomes too small to be inhabited, or a cottage with a door ten or twelve feet high, owing to the disproportion of the objects about them: and occasionally a road over a bridge three or four times the breadth of the arches which have to support it; or figures on the sea-shore, taller than the mast of a vessel placed at an equal distance from the eye of the spectator, &c &c.

Until perspective shall be considered among the first steps in learning to draw, such errors must continually offend, not only the judgment of the well-informed, but even the uncultivated observer will, on inspecting such pictures, feel that all is not right, although his ignorance of the art prevents him from pointing out where they may be wrong. We cannot but be of opinion, that much has been done to prevent the general study of perspective,

perspective, by the too great zeal of most writers on the subject. Some have unnecessarily made, what is in fact a very plain subject, into one of vast and complex importance; and more injury has been frequently done by proving too much than too little. One of our best writers has put forth so large a folio, and given examples upon example so multiplied and interwoven together upon the same plate, that an eye already well accustomed to such intricacies is required to unravel them; and, of course, the number among the uninitated must be small, who are willing to devote the time requisite for their development. Another excellent writer has erred in a different way: his book is small, and his mode of explanation is so brief, and at the same time so learned, that it loses very much of its general utility; had

had he written in one of the dead languages, he would not have had fewer readers.

A few have attempted a compromise between truth and error, by using expedients to avoid the inconvenience that will sometimes arise from the strict rules of perspective when an improper choice of station has been made. These expedients, to say the least, are unscientific; for there can be no other mode of perspective worthy of the name, than that which is of the strictest mathematical construction.

Andrea Pozzo, who published a work on perspective at Rome, in two volumes folio, A.D. 1693, has made so just a defence of mathematical perspective, that we are induced to give an abridged translation of the passage.—"Since perspective is but a "counterfeiting of truth, the painter is not

"obliged

" obliged to make it appear complete when " viewed from any position, but from one " determinate point only. If several points " of sight are assigned in one subject, there " will be no place whence you may get a " perfect view of the whole; and, at best, " you can but view each part from its own " particular point. Therefore, if, through " the irregularity of the place, the archi- " tecture and figures intermixed should seem " any thing lame when viewed out of the " proper point, it is so far from being a " fault, that I look upon it as an excellency " in the work, that when seen from the " point determined it appears with due pro- " portion, straight, flat, or concave, when, " in reality *(on the canvas)* it is not so."

It is only by objects that are reducible to rules, that we can be made to comprehend how

how rules might be supposed to operate upon things which are wholly beyond their reach, or so nearly so, as to make the result scarcely compensate the labour it would cost to bring them within those rules. We may understand how such irregular subjects as trees, figures, cattle, waves of the sea, &c. are affected by the ordinances of perspective, by having previously learned in the diagrams of more regularly formed objects, that the most minute recession will give a corresponding perspective decrease, according to the immutable law that all things appear to diminish by distance.

If

* " The smallest angle under which an object may in general be " viewed is about a minute. This angle gives for the greatest dis- " tance at which a strong eye may discern that object, 3,450 times " its diameter. For instance, an object one foot in dimension " becomes invisible at 3,450 feet distance; and a man five feet in " height is precluded from our view at five times that number of " feet,

If some of the tortuous branches, the advancing nodes, and deep receding sinuosities of old trees, might be executed by those, who, in addition to skill, possess much time and perseverance, to represent according to rule their clusters of leaves, with the endless ramification of the branches upon which they are placed, is an attempt not within the sphere of a diagram, and must be left to the pencil of those who have attentively sketched from nature.

In no department of painting does perspective

" feet, that is to say, 5,730 yards (about three miles). This calcu-
" lation is for common daylight: but if we would take our visual
" powers at the utmost, we must select an opportunity when they
" are surrounded by obscurity and the object inspected by light. As,
" for instance, a light of an inch diameter is discernible by night at
" about ten times the distance at which by day we could discern a
" foot diameter; consequently vastly beyond its daylight vanishing
" station, which is little more than four hundred yards."—*Fitzgerald on Painting.*

spective add more to the beauty of the performance than in portraits; and here, as in the preceding case, it must be left to the hand and eye. When a face is represented fronting the spectator, there is little more to remark than its height above or below the horizontal line, as the lines upon which the eyes, eyebrows, mouth, &c. are placed being parrallels, such a position gives them no tendency to unite, or in other words, to run to a vanishing point; but when one side of the face is turned from the spectator, it becomes apparently smaller than the side which is nearest, consequently those lines lose their parallelism, and would unite, if continued, in a point which would be called their vanishing point. It is by an exact attention to this that a singular charm is given to the portraits of the best artists. A learner would feel shocked

shocked at the idea of making one eye larger than the other, or a greater space between the eye and mouth on the nearer cheek than on the farther; yet very little instruction is necessary to shew its necessity: and a moderate degree of practice will also shew, that no grandeur or delicacy of expression can be obtained without an exceedingly minute observance of the laws of perspective. If a hand be advanced, it is to be drawn larger than the hand which retires. The same attention is to be carried to the feet, and every other part of the figure. For this purpose the knowledge requisite can only be acquired by going through the diagrams of more formal subjects, and thus fixing in the mind those precepts which require that a pencil should not be moved without a perpetual recurrence to them: afterwards it will

not

not be difficult to gain all that can be wished by drawing from nature, a practice of the very first consequence.

There are many to whom the power of sketching freely and correctly is of great value; but moments may occur when, to the military man, it might prove of infinite service. A faithful drawing is a written language that all can understand: it will often, at a single glance, convey more intelligence than hours of conversation or numerous pages of writing; and, in this persuasion, the Author feels that he cannot too strongly recommend the study of perspective, as one of the first and most important steps towards the attainment of an art of such extensive utility.

DEFINITIONS.

HORIZON or HORIZONTAL LINE, is a line drawn through the picture, the height of the observer's eye. Of course, the horizontal line would be proportionately lower to a person sitting than to one standing at the same station.

STATION, is a point on the ground-plan representing the position of the observer.

POINT OF SIGHT, is a point on the horizon opposite to the observer's eye, and is marked in the picture by a perpendicular line drawn from the station to the picture. In parallel perspective this is a principal vanishing point.

VANISHING POINT, is any point on the pic-

ture

ture where two or more lines will unite, the originals of which are parallel to each other, and placed at an angle with the picture. Vanishing points are formed by lines drawn from the observer or station parallel to the side of the object for which a vanishing point is required, till they cut the picture or plane of delineation. The intersection is the vanishing point.

Note. All objects whose sides are parallel have the same vanishing point.

" VANISHING LINE, is any line on the plane " of the picture, in which the representation " of original planes parallel to each other ap- " pear to meet or concentrate."

VISUAL RAYS, are supposed lines proceeding from the eye to every part of the object

or

or objects under view, forming a cone. A section of this cone made perpendicularly to its axis, by the introduction of a supposed plane, would give the perspective representation of the object or objects viewed.

Note. The supposed plane is the picture.

GROUND-PLAN, is a regular plan of the objects to be drawn, made according to a scale, and placed at the angle or angles they make with the picture.

ELEVATION, may be called a plan of the front or sides of buildings or other objects, made according to a scale. Such drawings as are used by architects and builders are called plans and elevations.

BASE LINE is the bottom of the picture.

LINE

LINE OF CONTACT, is a line upon which all real heights of objects are marked, according to a scale, and carried thence into the perspective work, by lines, to the respective vanishing points.

Note. This line is produced by continuing one of the principal sides of an object till it touches the picture. The point of contact is transferred to the base line, and a perpendicular formed upon it for the line of contact.

PICTURE,—PLANE of DELINEATION, or TRANSPARENT MEDIUM,—is a supposed plane between the observer and the object to be represented. The transparent plane or picture is always supposed to be placed at right angles with the line that bisects the field of view, or the angle made at the eye by the extent of the subject or country intended to

be represented. The bisecting line is the shortest visual ray to the horizon, and marks the point of sight upon it.

Point of Distance, is a point set off on either or both sides of the point of sight upon the horizontal line, and represents the distance of the spectator from the plane of the picture. This distance should not be less than the whole length of the picture.

DESCRIPTION OF THE PLATES.

PLATE I.

It is required to find the perspective appearance that a cube would make, supposing it to be placed with both its sides inclined to the picture or plane of delineation.

Draw the ground plan at the given distance from the picture and at the angles made with the picture by its sides, continuing one of them to the intersection at 5, in the upper figure upon the line marked *picture*. This is the point of contact. Draw also the elevation of one of its sides, which, being equal, will represent them all. From the station carry a line perpendicular to the picture, which at

the angle 2 will mark the point of sight. Carry also from the station two lines parallel to the sides of the cube until they cut the picture for the two requisite vanishing points. Lastly, draw the visual rays, 1, 3, 4, from the three angles of the ground-plan to the station. The second part of this diagram is to be placed below the ground-plan at a convenient distance, and is commenced by drawing the horizontal and base lines parallel to each other. The perpendiculars, 1, 2, 3, 4, 5, and the two vanishing points, in the order and at the same distances that they are placed from each other in the work of the ground-plan above. Mark the height of the elevation on the line of contact 5, measuring from the base line. From the point on the line of contact which marks the height of the elevation, and also from the bottom of

the

the line of contact, draw two lines to the left-hand vanishing point. Thus the top and bottom of the cube on that side will be obtained by the upper and lower intersections of the perpendiculars 1, 3. Two other lines carried from the upper intersections of the perpendiculars 1, 3, to the vanishing point on the right, and also a line from the lower intersection of the perpendicular 3 to the same vanishing point, will complete the two visible sides. There will then only remain wanting a line to finish the top: this is to be drawn from the upper intersection of the perpendicular 4 to its proper vanishing point, and the desired figure will be complete.

PLATE II.

It is required to give the perspective delineation of an open building with a doorway in its front; the sides and ends inclined to the picture. The whole to be placed below the horizontal line, that the thickness of the walls may be seen on the top.

This is an exercise on the preceding plate, with additional lines on the ground-plan *a. à. a. a. a*, laid down for the thickness of the walls. These lines are to be carried to the outer edge of the ground-plan, and from their points visual rays are to be drawn to the station; also visual rays from those lines, which denote the width of the door-posts, as shewn in the elevation, and from the point which marks the depth of one of the

them in the wall. The whole of the intersections are next transferred from the line denoting the *picture* to the base line in the lower part of the plate, upon which perpendiculars are to be raised to the horizontal line. The height of the building is then taken from the elevation and placed on the line of contact at 6, and a line drawn thence to the vanishing point on the left, with another from the foot of the line of contact to mark the lower part of the building. From all the different intersections of the perpendiculars, lines must be produced to their respective vanishing points, which by crossing each other will give the perspective thickness of the walls.

PLATE III.

The representation of a quadrangular building placed with both its sides inclined to the picture, and covered with a common A roof, is required.

Let the figure G, represent the ground-plan with one of its sides produced to 8, its point of contact with the line P. representing the picture. Let S. be the station, V.V. the two vanishing points. For the side and end of the building, let ⊙ be the point of sight; 1, 2, 3, 4, 5, 6, 7, the visual rays brought from the different parts of the ground-plan through the picture to the station S. The line *b.* is to represent the centre or ridge of the roof; *a. a.* the thickness of the front wall, and *k. k* the width of door.

The

The elevation of the front is represented by the figure E.; the elevation of the roof (or its perpendicular height) by E. R., and the door by I. The elevation of the end of the building is represented by E. E.; the inclination of the roof by *f. d. g.*, and is circumscribed by the ideal lines *f. l*, *l. m.*, and *m. q.*, for the purpose of finding the perspective apex of the end of the building, and with it the upper ridge of the roof.

When the perpendiculars, 1, 2, 3, 4, 5, 6, 7, 8, are placed upon the line B. in the lower figure, mark on the line of contact 8 the point *i.* for the height of the door I; also the point *h.* for the height of the side of the building E. Mark a point at O. for the height of the roof, E. R. A line is then to be drawn from the bottom of the line of contact

contact 8 to the left-hand vanishing point V., for the ground line of the building, which will be given at the intersections of the perpendiculars 1, 5. Draw another line from *i.* to the same vanishing point for the height of the door, shewn by its passage across the perpendiculars 2, 4. Carry a line also from *h.* to the same vanishing point, for the height of the side of the building, given at *e. f.*, by the intersections of the perpendiculars 1, 5; and a line from O to the left-hand vanishing point V. for the height of the roof: which would be, at *l.* were the centre of the roof advanced to the front of the building; but being removed considerably back, it will be necessary to produce a line from *l.* to the vanishing point V. on the right, in order to shew its height at the centre of the building, which will be given by intersecting the upright

upright line 6 at *d.*, the line 6 marking the perspective centre of the building.

The inclination of both sides of the roof is obtained by the ideal lines *l. f.*, *l. m.*, and *m. g.*, in figure E. E, being placed in perspective.

It is evident that the ridge of the roof *d. c.* being farther removed from the eye than the lower edge or eaves *f. e.*, must appear shorter, consequently the end lines, *d. f.* and *d. e.*, cannot be parallel, and would necessarily meet if continued sufficiently upwards. Their point of junction would be the vanishing point for the front or visible side of the roof.

This vanishing point is found by erecting a perpendicular line upon the horizon H. from the vanishing point on the right to V. R., the place where the line *f. d.* continued

tinued meets the perpendicular produced from the horizon. The farther end of the roof is determined by drawing a line from the angle *e.* to V. R., giving the perspective length of the ridge by intersecting it at *c.* The inclined courses of slates, tiles, &c. on this side of the roof would all tend to the vanishing point V. R, and horizontal divisions to their proper vanishing point on the left.

Lastly, for the thickness of the wall at the door, let the line *k.* be drawn from the angle made by the ground line of the building, at the intersection of the perpendicular 2, to the vanishing point on the right; for the section of the wall at the door being parallel to the end of the building, it will take the same vanishing point.

PLATE IV.

A perspective drawing of a house with a chimney and hipped roof, according to the elevations *fig.* 2 and *fig.* 3, and standing at a given angle with the plane of delineation, is required.

When the elevations, ground-plans, &c. are accurately laid down, as in the former plates, proceed with the perspective drawing, *fig.* 4, after the manner recommended in the foregoing examples, *viz.* by placing the horizontal and base lines H. B., also the perpendiculars 1, 2, 3, 4, &c., having their relative distances to correspond with the distances 1, 2, 3, 4, &c. in the ground-plan, *fig.* 1.

Next take the height of the roof from the ground line in the elevation, *fig.* 2, which

place

place on the line of contact at *e*. From this draw a line to V. 1, cutting the perpendicular 8 (the nearest corner of the building continued upwards): thence carry the line in the direction of the vanishing point V. 2; and from the intersection of the vertical 10 at the angle *o*., return the line again to V. 2, marking between the verticals, 2, 7, the extent of the roof, representing the space between A. B. in *fig*. 2. On the line of contact *h*. denotes the lower edge or eaves of the roof, which are obtained as in the last plate.

For the hipped ends of the roof carry lines from the angles made by the ridge line on the verticals 2, 7, slanting downwards to the three corners at the lower edges of the roof, where the perpendiculars 1, 8, 11, are intersected.

For the chimney take the height from the dotted

dotted line of the roof which runs through the elevation of the chimney in *fig.* 2. Place it upon the line of contact from *e.* to *d.*, and proceed as was done for obtaining the top or ridge of the roof, *viz.* by carrying a line towards V. 1, and from the angle at its junction with the perpendicular 8, draw the line towards V. 2, in order to bring the height upon the perpendicular 9, which represents the place where the nearest corner of the chimney would appear upon the transparent medium, or plane of delineation, to a spectator standing at the station S, and previously supposing this corner of the chimney brought to the end of the building, as laid down in the ground-plan, *fig.* 1, and shewn on the picture by the transit of the visual ray 9. From *g.* return the line to V. 1, which will mark the height of the chimney upon the verticals

verticals 3, 4. Then from the nearest corner of the chimney which is upon the vertical 4, draw a short dark line in the direction of V. 2, for its nearer end. The depth of the chimney within the roof is marked upon the line of contact at *f*, and carried forwards exactly in the same mode as for the upper part.

PLATE V.

LET *fig.* 1, Plate V. be the ground-plan of two buildings standing at right angles with each other, all their sides making angles with the picture; a chimney on the roof to the right, and a door in the building on the left, as marked on the ground-plan. Let *fig.* E. E. be the end of the part that has the chimney, and *fig.* D. the elevation of the door: let P. be the picture, and S. the station from which the whole is seen.

To obtain a perspective drawing according to the above plans and elevations, proceed as follows:

Presuming that the student has read the descriptions of the preceding plates, no more of the process need here be explained than

that which has not before occurred. When the height of the roof is laid down upon the line of contact as at *r.*, and transferred to the perpendicular 12, and again from that to the centre line of the gable end 13, from the point *k.* (the summit of the gable end), draw a line to the vanishing point V. 1.; and where it intersects the perpendicular 7 will be found the angle made by the upper junction of the two roofs at *h.*, from which carry a line to the left with the ruler placed upon V. 1 and *h.* for the top of the left-hand roof. Its length is determined at *a.* by passing through the perpendicular 2. The lower line of the roof is to be drawn in the same manner from the line of contact, and will intersect the vertical line 6 at *g.*, from whence a line drawn to *h.* will mark the junction of the two roofs. The lower edge of the left-hand roof is

gained

gained by taking a line from its proper vanishing point V. 2, through *g.* to *b.*, and thence to V. 1, for the eaves of the farther side of the roof. Next place the lines *c. a. b.* to complete this gable end.

In the process adopted for obtaining the height of the chimney there is a small difference between this and the last plate. In this example we take the heights from the line of contact to the continuation upwards of the nearest corner of the house 12, and from thence to the centre line of the gable end 13; and again, from this to the centre line of the chimney. For example, the top line of the chimney is marked *r.* on the line of contact, it is first carried to *s.*, thence to *t.*, and lastly to *u.*, upon which junction a short dark line is drawn right and left for that side of the chimney. It perhaps need not

be added, that this line must correspond with its own vanishing point V. 2. The height of the door, *fig.* D. is placed upon the line of contact at D., and carried to the junction of the two buildings at the perpendicular 6, by a line from the vanishing point V. 1; then by a line drawn from the vanishing point V. 2, through the angle made at the junction, and continued over the vertical lines 4, 5, the required height will be given.

The process for placing the chimnies in this and the preceding example will suit for objects that are placed upon others, as towers, turrets, &c.; and when their faces or sides are not parallel to the sides of the object upon which they stand, vanishing points must be laid down for them, as directed in the definitions. (Vide article *Vanishing Points.*)

PLATE VI.

It is required to find the perspective representation of the interior of a room, having its sides placed at right angles with the plane of delineation and the two ends parallel with the same plane.

Let S. *fig.* 1, be the station at one end of the room *z. z.* Let P. P. determine the distance of the picture, intersecting the cone of visual rays *a. b. c. d. e. f. g. h. i. k. l. m. n. o. p. q. r.* at something more than one-third of the length of the room from the station. The necessity of this will be very apparent, when it is considered that it is quite impossible to stand in a room and draw the sides of it up to the end at which the spectator may be placed without moving the head half round on each side;

side; and also, as no drawing of interiors can be made with any truth when the artist is obliged to turn his head to the right and left to see his subject, it is better that no more should be introduced than the eye can conveniently take in at a single view. Let the double lines on each side of the ground-plan, *fig.* 1. represent the thickness of the walls. Let A. B. and C. D. shew the width of the two windows that appear in the drawing, *fig.* 2. The short lines at A. B. C. D. parallel with the picture, mark the depth of the embrasures or thickness of the wall. Let K. I. be the width of the fire-place, and M. K.—I. L. the breadth of the marble on its sides. E. F. shall represent the width of the door-way; H. the door opened to a certain angle; and the semicircular dotted line G. the sweep that the door will describe in

opening

opening or shutting, by the aid of which the width of the door may be correctly laid down at any given angle. V. 2. gives the place of the vanishing point for the top and bottom of the door: V. 1 is the vanishing point for the edge or thickness of the door. As this line is so short that we cannot easily obtain a true parallel to it from the station for its vanishing point, it will be more correctly performed by first placing the vanishing point V. 2. and then by carrying from the station a line at a right angle with the line that marks the position of V. 2. The position of V. 1. will be obtained, if we suppose the edge of the door to make a right angle with its side. Let ⊙ be the point of sight and centre of the picture being the vanishing point for all lines that are perpendicular to the picture, it will serve for the upper and lower lines of the

the room, windows, and door-way. The depth of the wall in the door-way is shewn by short lines at E. F. The double-dotted lines, *s. s. s. s.* on the right and left, standing between the lines P. P. and Z. Z., are merely to complete the size of the room. The short dotted lines *t. t.* shew where the third window is placed; but as this portion of the room is not introduced in the perspective, *fig.* 2, no further reference to it will be requisite.

For the perspective drawing, *fig.* 2, we commence by drawing the lines H. H. and B. B. for the horizontal and base lines, with the perpendiculars *a. b. c. d. e. f.*, &c. placed upon the base-line, at distances equal to the distances on the line P. P., *fig.* 1, made by the visual rays upon the picture in their passage from the station to the various points on

the

the ground-plan. Place upon the horizontal line H. H. *fig.* 2, the points V. 2. ⊙ and V. 1, also at their proper distances, according with the ground-plan, for vanishing points. In this example, the sides of the room coming close up to the picture, will serve all the purposes of a line of contact on either or both sides of the drawing, being in contact with the picture. Thus the points N. O. *fig.* 2, being assumed as the length of the windows, may be laid down on the line which is produced by a continuation of the inner dotted line S. *fig.* 1, to the base line B. B. *fig.* 2, for the termination of the room on that side: then by drawing lines from the points N. O. to the centre of the picture ⊙, the upper and lower lines of the windows will be determined; also by drawing lines from the angles made by the junction of the

two

two outer perpendicular lines of the room and Z, Z. to the centre of the picture or point of sight ⊙, we shall obtain the upper and lower lines of the room where it divides from the ceiling and floor. The two further corners of the room are marked by the intersections of the vertical lines *l. f.*

It is to be noticed, that all original lines which are parallel with the picture take no vanishing point, but are to be laid down in the perspective drawing parallel to the horizontal and base lines: accordingly the lines of the ceiling at the farther end of the room, the thickness of the walls in the soffits, and sills of the door and windows, are all to be made parallel with the horizon and base lines. Thus to obtain the breadth of the soffit in the first window, draw a line from the intersection of the perpendicular *p.* by the line

N. ⊙, parallel to the horizontal line until it cuts the perpendicular *q*, producing the required breadth of the ceiling of the window, more properly called the soffit.

The same process serves for the remaining window and door.

For the height of the door-way carry a line from the point W. (its assumed height) to the point of sight ⊙. From V. 1 draw lines through the angles made by the line W. in its passage over the perpendicular *c*, the line upon which the door is supposed to hinge: continue the line to the perpendicular *d*, thus attaining the thickness of the door at the top. The same process will mark its thickness at bottom. From the upper and lower intersections of the perpendicular *d*. draw lines to the vanishing point V. 2, which in their transit across the vertical line *e*. will

shew

shew the height of the farther edge of the door. The lock on the door, and the frame over the fire-place, are introduced for the sake of finish and without data. For the fire-place nothing more than the perpendiculars are given, as *k. i. h. g.*, *fig.* 2: the height would be found in the usual way. The lines seen through the door mark the floor and ceiling of an adjoining room, and are produced by continuing the floor and the ceiling of the room that we have just completed.

PLATE VII.

THIS is an easy exercise on the last plate, and represents a portion of a street, where the spectator is supposed to stand opposite to its centre, of course seeing an equal quantity of building on both sides.

The point of sight is the only vanishing point requisite in this diagram. The lines on the ends of the buildings being parallel to the picture, require none, and are all to be made parallel to the horizontal line. The depths of the windows and doors, and also the thickness of the walls, have been omitted throughout for the sake of perspicuity, the preceding plate having sufficiently explained the mode of introducing them.

PLATE VIII.

THE perspective appearance of a bridge is required composed of one arch, and placed at a given angle with the picture.

Fig. 1 shall represent the ground-plan, the line C. marking the position of the centre of the arch. The lines A. B. shall shew the span of the arch and also the width of the piers. Let visual rays be carried from all the angles to the station S. It is not unfrequent in perspective diagrams to be obliged to imagine the object transparent (as in this), for finding the situation of fronts by their agreement with the farther or hidden sides of the object. Here we are obliged to draw the visual ray 4, *fig.* 1, through the body of the pier, as the angle from which it is taken could

could not be seen from the station at S. Let *fig.* 2 represent the elevation or plain front view: the parallel lines H. I., M. N., D. E., C. O., and the diagonals G. O., F. O., be placed to assist in finding certain points, by their intersections of the different perpendiculars and each other. It is through these intersections, when produced in the perspective *fig.* 3, that the ellipsis representing the arch of the bridge is to be drawn by hand, or by finding the centres of the ellipsis after the leading points are laid down, as circles or segments of a circle, become elliptic when seen in angular perspective: that is to say, upon a surface that makes any given angle with the picture. Let the lines K. P. P. L., *fig.* 2, mark the base, summit, and ends of the bridge; D. E., the line from which the arch springs; O. the centre, and A. B. its extreme

extreme width, as measured from the ground-plan A. B., *fig.* 1. A point on each shoulder of the arch is found by the diagonals G. and F. intersecting the line M. N. The centre of the key-stone of the arch is marked by the perpendicular C. intersecting the line H. I. The arch is next to be described upon these points from the centre O., and bounded by the perpendiculars A. B.

When the horizontal and base lines are drawn in *fig.* 3. H. B., set off the perpendiculars 1, 2, 3, 4, &c., *fig.* 3, at proper distances from each other, agreeing with the same in *fig.* 1, also the vanishing points V. 1, V. 2, and point of sight ⊙: then upon the line of contact 1 place the points *k. h. m. d. p.* equal to the heights K. H. M. D. P., *fig.* 2. From those points draw lines to V. 2, and from the upper and lower intersections of the

perpen-

perpendicular 3, carry lines to V. 1, by which we get the general contour of the bridge. The intersection of C. 7, by a line from *d.* to V. 2, will mark the perspective centre of the arch at O.: also the crown of the arch at *y.* will be given by the passage of the line from *h.* across the same perpendicular. The diagonals *g. f.*, by cutting the line *m.*, will give the places of the shoulders of the arch. We have now obtained five points, namely, the two points from whence the arch springs, given by the line *d.* V. 2 at its passage through the verticals 5 and 9, the two shoulders and the crown.

The ellipsis is now to be drawn through these points with a steady hand: afterwards we proceed to discover the situation of the farther side of the arch. First draw the dotted line *o. o.* from the vertical 7 to the

vertical 6, in the direction of the vanishing point V. 1. This gives the back centre of the arch. From the angle at the junction of the diagonal *f.* with the vertical *g*, draw a dotted line towards V. 1, stopping at the angle *u.* on the perpendicular 8. We shall then gain the top of the back arch by laying the ruler from V. 2. to *u.*, and thence carrying a dotted line to *s.*, where it touches the upright line 4, passing through the upright line 6. at *t.*, the crown of the farther arch. The dotted diagonals *s.o.* and *u.o.* are to be drawn: after this, a line from the point *w.*, made by the line *m.* upon the vertical 3, in the direction of V. 1, thus giving at *n.*, on the perpendicular 2, a point from whence a dotted line drawn to V. 2, will mark the shoulders of the farther arch, by crossing the dotted diagonals *f. o.* and *u. o.* The dotted line *a. a.*

is to be produced by carrying a line through the farther centre *o*. to V. 2, marking upon the perpendiculars 4. 8, the points from which the back arch is to spring. The dotted part of the ellipse is that portion of the perspective arch which would be invisible.

PLATE IX.

IT is required to place in perspective an arcade of three arches standing on a plane parallel to the picture or plane of delineation, the point S., *fig.* 1. being the station from which the arcade is to be viewed.

Note. Arches situated on a plane parallel to the picture will not vary in size but be equal to each other along the front, and also the back part of the arches will be equal to each other, assuming that they are arches of equal magnitudes in the originals. Thus the apparent size of any one of them at the front will determine the front of all the rest, and the apparent size of the back of any one of them will give the size for the back part of the remaining arches.

The

The ground-plan being accurately laid down as in *fig.* 1, we proceed in the usual mode, working only for the centre arch, the others being worked in the same manner. Let ⊙, *fig.* 2, be the point of sight placed upon the horizontal line H. Let *g. h.* be the perpendiculars for the depth of the pier on the left; *l. m.* for the depth of the pier on the right; *i. k.* for the situation of the front and back arches; and the perpendicular X. the line of contact. Let the dot 1. on the line of contact be assumed as the whole height of the arcade, from which a line is to be drawn to the point of sight (vide DEFINITIONS, *point of sight*); at the intersection of the perpendicular *a.* is obtained the perspective height of the front of the arcade, from which a line is to be carried parallel with the horizontal line H. till it meets the perpendicular

s. At 2, on the line of contact, we suppose the depth of the band, coping, or parapet of the wall, which is produced on the arcade in the same manner. From 3, on the line of contact, we obtain by the same mode the heights of the piers on which the arches are turned: 4. marks the depth of the capitals of the piers; and 5. is to give the perspective distance into the picture of the base of the arcade, shewn at the angle *b*. Next is to be placed one point of the compasses at *v.*, the front centre of the middle arch, which is given by the passage of the parallel line obtained from 3. across the perpendicular *k*. at *v.*: the arch is then to be turned from the intersections made by the same parallel 3., at the perpendiculars *g*. *m*.

From the centre of the back of the arch draw the dotted line *v.* to the point of sight:

at

at its transit over the perpendicular *i.*, the point *w.* will be marked, from which describe a smaller circle to meet the perpendiculars *h. l.*, as was done for the front. Although a line drawn through the point *w.* to the right and left, and parallel with the horizon, would, by intersecting the perpendiculars *e.* and *n.*, be sufficient to produce the back centre of their respective arches, it has been considered useful to lay down also the manner used in the centre arch, by carrying dotted lines from the fronts, as at *t. y.*, to the points *u. z.*; thus giving to the student a satisfactory proof of the correctness of both modes, by their uniting so exactly in the same result.

The depth of the piers at their basis, is shewn by lines drawn from the angles made at the base of the arcade, by the line 6.

passing

passing (parallel to the base of the picture) through all their front perpendiculars, and are to be drawn severally to the point of sight ⊙, giving at the intersections of the vertical lines *c. h. l. p.* the depth of the sides of the piers. The lines 7. 7. 7. finish the base of the arcade at the back.

PLATE X.

THE perspective area of a square space on the ground at a given distance from the plane of delineation is required, the front of the area being parallel to the picture.

The four lines A. B. C. D., *fig.* 1, are to be laid down as the boundaries of the required area, and placed at a given distance below the base line of the picture B., which is to represent the actual distance of the area from the picture.

Note.—This diagram, as well as figure 2, are constructed upon the principles laid down in the Jesuits' Perspective, and are taken from an anonymous author.

Let the sides D. B. be continued upwards

to

to the base of the picture at *a. a.*, from whence two lines carried to the point of sight ⊙ on the horizontal line H. will give the two lateral boundaries of the perspective drawing. The line S. ⊙ represents the distance of the spectator from the picture, which carried down to the horizon at *d.* places what is called the point of distance, to which all lines that make an angle of 45° with the ground-line may be drawn; a discovery, perhaps, first published to the world by Serlio, in 1540.

Produce the diagonal in the ground-plan A. B. C. D. and continue it to the base line of the picture B. at *c*. From *c*. draw a line to the point of distance *d.*, which will cut the two side lines of the perspective area *g. h.* at *e*. and *k.*; from which points lay down the lines *i. f.* parallel to the base and horizontal

lines,

lines, and the required perspective *i. g. f. k.* will be completed.

Figure 2. is the representation of a solid in perspective, two of whose sides are parallel to the picture, and is also constructed on the principles used in the Jesuits' Perspective.

When the ground-plan is drawn as in *fig.* 1, and the perspective base of the solid *g. i. f. h.* as in the same figure, draw the line of contact *b.* by a continuation of the side B., or at the point *a.*, where the side B. of the ground-plan is made to come in contact with the base of the picture, erect the perpendicular *b.* for the line of contact. Place the four perpendiculars, *p. o. q. n.* of any indefinite length, upon the angles at the base of the solid. Let the point *m.* on the line of

contact

contact be assumed as the height of the solid, from which a line is to be drawn to the vanishing point ⊙ (point of sight), which will intersect the perpendiculars *n. q.* at *r. s.*: then from the angles *r.* and *s.* draw two lines parallel to the base and horizontal lines B. and H., which will cut the opposite perpendiculars at *n. l.* From *l.* carry another line to the vanishing point ⊙, which will finish the required figure.

Figure 3. shews the perspective appearance of a circle at a given distance below the horizontal line. This diagram is ascribed to the invention of Serlio, and is also taken from the Jesuits' Perspective.

If the circle be large take the following method, which Serlio has directed. Set one foot of your compasses in the middle of the funda-

fundamental line, with the other describe the semicircle A. *z*. B.: divide its periphery, or circumference, into any number of equal parts at pleasure. You will see in the process, that the more of these divisions, the easier it will be to form the circular lines from the junction of which the circle receives its appearance. The semicircle A. *z*. B. is here divided into eight parts, which is the usual practice. From the several divisions, *z*. *z*. *z*., &c. perpendiculars are raised to the base line, in the points *e*. *e*. *e*., &c.: this done, the diagonal is to be drawn to the point of distance upon the horizon. Thus you get a square, A. H. I. B. Draw lines or rays from all the points, *e*. *e*. *e*., &c. towards the point of sight, and through the intersections of those lines with the diagonal draw parallels. Then beginning in the middle

of

of one of the sides of the square to make a point, as *a.*, connect it by a circular line with the opposite angle *b.*; and proceeding thus with arches from angle to angle, according to the direction of diagonals through the points *a. b. c. d. e. f. g. h. i. k. l. m. n. o. p. q.*, you will have the whole circle in perspective.

For a pavement, tessalated or plain, the mode pursued in this diagram would be sufficient, with no other difference but that of marking the divisions *e. e. e.*, &c. at equal distances upon the base line.

Figure 4. is another plan for performing the same operation, which will readily be understood after the student has worked the three preceding figures. The only remarkable difference is in the construction of the ground-

ground-plan, which gives the perspective circle by producing only eight points through which the ellipsis is carried, instead of sixteen, as in *fig.* 3.

PLATE XI.

FIGURE 5. represents a shallow tub put with its front or mouth parallel to the picture. This figure, and also figures 2, 4, and 7, are borrowed from the Jesuits' Perspective, a very excellent work at the time it was published, and still abounding with much useful information collected from the different ancient writers upon the subject.

Having described a whole circle, B. L. I., from the centre A., from the same centre, and from the extreme of the diameter B., draw lines to the point of sight ⊙; then setting the breadth or thickness required, on the line B. I. as here D. A., from the point D. draw a line to the point of distance E., and through F., the point where D. E. and A. ⊙ intersect,

intersect, draw a line parallel to the base till it cuts the ray B. ⊙ in the point *g*. This done, setting one leg of your compasses in F., and in the other taking the distance *g*, describe as much of a circle as the outer edge of the tub will permit, and which will be its depth. All the lines L. L. are to be drawn to the point of sight ⊙, and the short lines on the edge of the tub, also belonging to the division of its staves, must be carried to the centre A. The same process will serve for circular and semicircular windows when parallel with the plane of delineation, as is shewn in the figures 2 and 4.

The method of putting elliptical or flat arches into perspective is the same with the semicircular, when also parallel with the plane of delineation. The principal difficulty is in finding the outline, and for which the

following mode (amongst others) may be used.

Suppose the line *c. d. fig.* 3, given, upon which a flat arch is to be raised of the height *e. e.* From the centre *e.* describe a semicircle, *c. g. d.*, and divide it into any number of equal parts at pleasure, as is here done into eight, and from all these divisions draw lines to the centre *e.*; then again from all these divisions draw perpendiculars to the diameter or chord *c. d.*, as are here the lines *o. i.*, *o. i.*, &c. This done, describe a semicircle of the given height of the arch, as here, *h. e. k.*, and through the intersections made by this lesser circle on the division lines of the greater, draw little parallels to meet the perpendiculars which fall from the same divisions (for instance, *l. o.*, *l. o.*, *l. o.*, &c.), and the

several

several points *o*., connected together as is here done, will give you the arch required. It will readily be perceived that the arch may be made more or less flat by decreasing or increasing the inner circle. This figure and description are taken from Serlio.

Figure 1. represents the manner in which two columns lying on the ground parallel to each other, and having both their ends parallel to the picture, of course the direction of their axis will be towards the point of sight, their proper vanishing point. This figure is so simple that it requires no other explanation.—*This is from an anonymous author.*

PLATE XII.

REQUIRED, the perspective drawing of a box with the lid open, at a given angle, the end and front of the box being placed at certain angles with the picture, according to the ground-plan, *fig.* 1.

Let figure 2. represent the front of the box without the lid; *k. i.*, the depth of the key-hole; and *m.* the centre upon which it is placed. Let *fig.* 3 give the elevation of the end of the box, with its lid opened at the angle given, and the various lines requisite for finding the two upper angles of the lid.

Note. The simplest manner of finding the inclination of planes, or of placing cones, pyramids, prisms, &c., whether upright or inclined, in perspective, is to inscribe the figure within a right-

a right-angled solid or plane, of which the different lines or faces of the figure may be supposed so many sections; and as a right-angled solid or superficies is very readily placed in perspective, any form inscribed within such figures will necessarily be correct, if a sufficient number of leading points are laid down in the plan and elevations. In this elevation (*fig.* 3) we suppose the principal portion of the lid to be placed upon a plane equal to the width of the end, and also equal to the highest point of the lid. This plane is intersected by the lines *d. d.*, *a. b.*, the arc *e*, the diagonal *f.* (its opposite *g.* is without the plane), and the lines *h. i.* parts of the lid. The lines *a. b.* are to be placed in their relative positions on the end of the ground-plan, and produce the visual rays 5. 6.

Let

Let *fig.* 4. be the perspective drawing, with the vanishing points V 1. V 2, and the perpendiculars 1, 2, 3, 4, 5, 6, 7, transferred from the ground-plan *fig.* 1. When these are rightly placed upon the base line, mark the various heights on the line of contact, as *l. k.* for the key-hole, *n.* for the height of the box, *d. e.* for the points given by the two upper angles of the lid in *fig.* 3. Let the perpendicular 3 be continued above the box, to represent the line *e. d. o.*, *fig.* 3.

As Plates I. and II. sufficiently explain the work used for obtaining the perspective of the box, we shall proceed only with the lid.

When the points *d.* and *c.* have been carried to the perpendicular 3 by lines to V. 1, let other lines be drawn from the points so produced in the direction of V. 2. These will give the small square in perspective, of which

f. is

f. is the diagonal. Let *f.* be continued upwards in the same direction, where it will fall upon a vanishing line which is perpendicular to the horizon, and drawn through the vanishing point V. 2. We thus gain the vanishing point at V. 3. for the shorter lines of the two ends of the lid, the nearer end of which is to be perfected by taking a line from the lower angle of the same perspective square of which the diagonal is *f.* through that corner of the box where the lid is joined, and to be continued downwards until it meets the perpendicular vanishing line that is brought from V. 2. The point of junction will be another vanishing point for the longer lines of both the ends of the lid. From this same vanishing point draw another line to the upper point of the diagonal *f.*: there will then only be wanting a line from the angle at

the

the junction of the box and its lid, to be carried to V. 3, which will finish this end by the intersection at *m*. From the angle *m*. make a line to V. 1, also the line *a*. to V. 3, for the farther or internal corner. Next place the line *v*., which is to be drawn from the vanishing point below the base line through the farther junction of the box and lid, and continued till it intersects another line drawn from the lower point of the diagonal *f*. to V. 1, making the angle *z*. From this angle produce another line to V. 3, thus intersecting a line that has been brought from the upper point of the diagonal *f*. This completes the lid. The thickness of the materials which might compose its sides would be drawn according to Plate II.

PLATE XIII.

THE perspective representation of a target is required, of two circles upon a quadrangular board inclined to the horizon at a given angle, and also standing obliquely to the picture.

Let A. B. C. D., *fig.* 1, represent the board upon which the circles E. and F. are inscribed, and let this board be divided into a stated number of squares.

Let the inclined parallelogram I., *fig.* 2, represent the thickness of the board and its degree of inclination. Let the two longest sides of this parallelogram be placed within two other parallelograms, whose longest sides are perpendicular to the horizon, and of such size that they may circumscribe the two sides

of

of parallelogram L. so exactly, that they shall become the diagonals of the ideal parallelograms G. O. N. K. A., and M. Z. I. K. A.

Let C., *fig.* 3, be the ground-line of the board placed at the angle it makes with the picture P., and continued to *m.* for the point of contact. Let K. be the ground-line of the two ideal parallelograms K., *fig.* 2. Upon the ground-line of the target C. mark a number of points at equal distances, agreeing with the number of squares and their width on the target, *fig.* 1: also at the farthest end of the ground-line K., *fig.* 3, set off the space which originates the rays *n.* *o.*, equal to the width N. I., *fig.* 2. From all these points, on C. and K., *fig.* 3, draw visual rays to the station S., a line from S. to ⊙ for the point of sight, and also the two vanishing points, V. V., for the sides C. K.

When

When the horizontal and base line, *fig.* 4, and the perpendiculars, *a. b. c. d. e. f. g. h. i. k. l. m. n. o.* are correctly arranged, draw from the foot of the line of contact to V. 1 the ground-line of the board, and at the intersection of the perpendicular *l*, commence a a line to V. 2, for the foot of the ideal parallelograms K. From B. and R., which represent on the line of contact at the height of the lines G. M., *fig.* 2, produce lines towards V. 1 till they touch the perpendicular *l.*, and from their places of contact return two lines to V. 2, which on their passage over the perpendiculars *n. o.* will give the angles O. Z. Next through O., and from the angle made on the perpendicular *l.*, by the transit of the ground-line of the target, draw the inclined line X., which is continued upwards till it touches the vanishing line Z. at V. 3, where it makes

the

the vanishing point for the face of the board. Again, draw a line from O. to V. 1, which gives the top of the board; and another from the intersection of the perpendicular *a.* by the ground-line, to be carried to V. 3, will finish the outline of the front of the board. Also from the angle O. draw a line through the angle Z., which falls upon the perpendicular vanishing line Z. out of the plate, but where they meet will be the vanishing point for the upper and lower short lines that mark the thickness of the board. We will call this vanishing point, although not seen, V. 4; to which, from the intersections of the perpendiculars *a. l.* on the ground-line, are to be drawn lines for the two lower corners of the board. These are defined, first, by the line Y. brought from V. 3, through the angle Z. made on the perpendicular *o.*; and at the

place

place where it meets the line that proceeds from the nearest lower corner of the board to V. 4, another line must be drawn to the vanishing point V. 1. The squares now may be transferred from the line of contact and the perpendiculars in the usual way, noticing that from the points where the perpendiculars *a. b. c. d.*, &c. meet the ground-line, the lines proceeding from them are to be carried to V. 3, their proper vanishing point. When the squares are constructed, the two ellipses E. F. may be drawn through the places on the squares that answer to the same places on the corresponding squares of *fig.* 1.

PLATE XIV.

IT is required to produce the perspective drawing of a church, with its porch, a square tower, and an octagon spire, according to a given ground-plan as laid down in Plate XIV. *fig.* 1.

Note. The geometrical elevations, for want of space, are omitted; but as all the proper heights of the different parts of the building are assumed upon the line of contact, it is conceived that no inconvenience can arise from their absence.

In laying out the ground-plan, bring the lines that mark the breadth of the tower through the body of the church, within the sides to which they are parallel. The nearest, and from which the visual ray *k.* takes

takes its origin, will be found necessary for the formation of the tower. Let the plan of the spire be laid down on that of the tower, by first describing a circle, and afterwards converting it into an octagon, by crossing at right angles the centre or roof line of the church, which is continued through the middle of the tower. Thus, by means also of the two diagonals, which we suppose to have been previously laid down for finding the centre upon which the circle is turned, the eight sides of the octagon are produced. From the five angles of it that would be visible at the station, and also from the centre, the visual rays be carried down to the station S. The ray from the centre of the circle is to produce the apex of the spire. The windows, door, &c. need not be described, having been already worked on former

former plates. It may be remarked, that the centre line in the plan of the porch standing perpendicularly to the body of the church is for its roof.

We will suppose the whole of the visual rays, vanishing points, point of sight, &c. transferred to the base line in *fig.* 2, and the heights placed upon the line of contact *i*. For example, the first dot from the base for the window sills; the second, for the top of the door in the porch; third, for eaves of the roof of the porch; fourth, for window tops on the front of the church; sixth, for the tops of the windows at the east end. V on the line of contact, for the height of the church roof, which is first to be carried to X. and thence to V. 4, marking the height of the roof at the intersection of perpendicular *g*, *r*. gives the height of the tower at the line

of

of contact, which is to be drawn to *s.*, the continuation of the nearer corner of the church. The line is thence to be taken in the direction of V. 4. till it meets the perpendicular *k. k.* From the point where it touches take a line to V. 1., which passing through the perpendiculars placed for the front corners of the tower, marks its height. Commencing again on the line of contact at the point *t.*, and proceeding in the same manner, we obtain the depth of the parapet. For the spire, the height is first laid down on the line of contact at A., is then carried to B., and from B. to G., the perpendicular of the centre or roof line of the church. From the angle at C. draw a line to V. 1., which at D. will cut the perpendicular *c.*: the position of this vertical line, for marking the centre of the spire, has been obtained by the visual

ray *c.* in *fig.* 1. There will now only be wanting five lines to be drawn from the summit D. to the top of the tower, at the angles made by the vertical lines *a. b. d. e. g.*, forming the four sides of the spire which are visible from the station. The vanishing points for the roofs of the church and its porch are to be found as in Plate III. The width or thickness of the wall in the door of the porch is indicated by the perpendicular line *h.*, which here serves two purposes, answering also for the outer angle of the tower, and is occasioned by the visual ray *h.*, *fig.* 1., in its passage from the right-hand corner of the tower, falling exactly upon the angle made by the short line which traverses the thickness of the wall in the door of the porch. Thus the visual ray *h.*, *fig.* 1., serves a double purpose: a circumstance that must frequently occur in drawings where there is much work.

PLATE XV.

POLYGONAL columns, towers, turrets, &c. are most conveniently worked from a circular ground-plan, on which is to be inscribed the number of sides that the original object may possess, every angle visible to the spectator sending visual rays to the station, intersecting the picture, and requiring a vanishing point for each face of the polygon when none of the sides are parallel to each other; but where there are two faces regularly opposing through the figure, as in the subject of the present plate, one vanishing point will always serve two sides, as the point of sight for the sides 3. and 9., *fig.* 1.; which are perpendicular to the picture, V. 2. 8., for the sides 2. 8.; V. 10. 4., for the sides 10. 4.; V. 1. 7., for the

sides 1. 7.; and V. 11. 5., for the sides 11. and 5. The sides 12. and 6. being parallel to the picture, of course do not require any vanishing point. In the example before us, the nearest face of the column is brought close to the picture, to avoid the necessity of using a line of contact, and diminish the number of references; thus also the perspective representation is obtained on a larger scale. The same has been done in the following plate of the winding stairs, for which this subject has been arranged to serve as a leading lesson. Whenever it may be necessary to work these or similar subjects at a distance from the picture, no difficulty can occur to the student who has paid attention to the first three Plates, with regard to the difference of arrangement for any given distance of the original objects from the plane of delineation.

In

In *fig.* 2., the diagonals *r. p. o. s.* are drawn from the angles that are represented in *fig.* 1. by the same letters, thus giving in the easiest mode the perspective centre of the top of the column: and it may be here noticed, that whenever diagonal lines will give the centre of an object in an elevation or ground-plan, they will also give the perspective centre when the angles from which they are to be drawn are placed in perspective. This is exemplified in *fig.* 2., where a diagonal line is drawn from *r.* to *e.* on the face of the column marked 11.: it is crossed by another from the opposite angles of the same face, and their intersection at *u.* will be found to fall precisely upon the perspective centre, as given by the varied operations of the ground-plan and vanishing points working together. The line round the middle of the column, *fig.* 2., dividing

dividing it into two equal portions, is placed to shew that the diagonals intersect at the proper point. The lines A. B. C. D. E. are added, to give the appearance that the column would take above the horizontal line at the height laid down.

When a circular column is required, the circle (or rather ellipsis when placed in perspective) must be finished by hand. In the construction of circular objects, it is perceptible that a polygon with a large number of sides would leave little for the hand to finish; and no other mode of discovering its perspective angles would be so safe, as to rely on the perpendiculars deduced from a well-arranged ground-plan for their several points of union.

PLATE XVI.

THE perspective of a winding staircase, making a circuit of twelve steps, the nearest of which has its end parallel with the picture and in contact with it, is required.

Let the ground-plan be laid down as in the preceding plate, by converting a circle into a dodecagon and carrying rays to the station, which for want of space we have been obliged to place at S. in *fig.* 2.; but having no connection with the figure, and also by not drawing the rays down to it, all possibility of confusion is avoided. Place the line which represents the picture parallel and in contact with E. 12., the nearest step; then the horizontal line H., *fig.* 2., and the perpendiculars *a. b. c. d. e. f. g.*

h. i. k. l. m. n.; afterwards all the vanishing points for the fronts and ends of the steps. Let it also be noticed, that the landing step A. and the highest step but one precisely over the step A. require no vanishing point, their ends being parallel with the picture; and also, that the steps marked E. 3. and E. 9., *fig.* 1., having their ends perpendicular to the picture, will take the point of sight for their vanishing point. When the vanishing points are all correctly arranged, the work will proceed with much ease; and should the student make any mistake it will immediately detect itself, so that he runs no risk of overlooking an error in the course of the work.

Let the height of E. 1. be assumed on the perpendicular *i. fig.* 2., and thence draw two lines to V. E. 1., its proper vanishing point.

From

From the point where the upper line intersects the perpendicular *m.* draw a line to V. 2. 7., and also two lines from the nearest corner of the step on the perpendicular *i.* to the vanishing point V. 1. 6. By this we not only complete the step, but also get its height, and that of all the other steps at the centre of the pillar, represented by the perpendicular *g.*, as it follows, that all the steps at the centre being at the same distance from the eye, must appear of equal heights.

With the compasses mark the height of each step on the centre vertical line *g.*, and through each division of this centre-line draw others to their respective vanishing points: as V. 3. 8. (this occurs out of the plate), V. 4. 9. (this also is out of the plate), V. 5. 10., V. 6. 11., and V. 1. 6. These points are for the fronts or longest sides of the

the steps. The vanishing points marked V. E. 11. 5., V. E. 10. 4., V. E. 3. 9., V. E. 2., and V. E. 1., are for the ends or shortest faces of the steps. These points will bring all the ends of the steps into their exact places, if the previous work has been correctly drawn, affording an agreeable proof of the precision with which this system of perspective performs its operations, in the accurate junction of all the angles with each other at their particular places on the perpendiculars stationed to receive them.

When the student has gone through the preceding lessons, he will be able to judge of the work that would be requisite for a perspective view of some one of the many beautiful cathedrals existing in Great Britain. How many plans, not merely of the foundations,

tions, but for every height, where the building or its mouldings make the smallest alteration by advancing or retreating, wherever the buttresses increase or diminish, wherever there are niches, canopies, or shrines for saints, the flying buttresses, perhaps highly ornamented on their sides and the soffits of their arches; again, the plans of clustered columns with their wreathed or zig-zagged capitals; for turrets, pinnacles, crockets, and those branches of foliage that terminate the pinnacles called finials, with all the variety of shapes to be found in the mullions and tracery of the windows, &c. &c. To these plans must be added correct elevations and admeasurements of every minute part, with all their heights, their distances, and angles made with the picture, &c. To say such a drawing

drawing is impossible would be saying too much: but all who have given perspective any consideration, must be aware of the infinitely complex nature of the work when carried into execution, at every point and through its smallest details; and how much more desirable it would be to take the leading lines only for the different parts, and trust to the decision of the eye for filling up the intervals. In short, at all times very much must be left to the hand, as the instances are exceedingly rare where a draughtsman can have the opportunity of getting any of the requisites above-mentioned, should he even be inclined to make the trial.

In concluding this division of our work, it may be permitted to revert to a subject already touched upon in the Introduction, of

too

too important a nature to need any apology for its repetition, and to lay before the student part of the statement as it exists in Mr. Kirby's Perspective,* a work valuable in every

* He says that objects "are to be drawn as they appear to the eye, under the most pleasing and agreeable shapes; and if this is not clear enough, the following instance may perhaps more fully explain my meaning. Suppose a family picture were to be drawn with several figures, and as near as possible to what are called the strict rules of mathematical perspective: then, indeed, the figures near the middle of the picture would appear to be correctly drawn, but those which had the misfortune to be placed near the edges of the frame would appear like so many anamorphoses or deformations. Now this, I presume, would be displeasing to every one, and particularly to those whose real figures they were intended to represent: and I am persuaded that it would be no great satisfaction to any lady or gentleman, were the painter to assure them that they were only distorted by the true principles of perspective; but if they pleased to peep through a pin-hole at some distance, they might then see themselves drawn to a mathematical exactness, &c. If, therefore, the human figure must not be represented according to the strict mathematical perspective rules in a portrait picture, but must be left to the discretion of the artist, then this is one instance of the necessity of deviating from them upon some particular occasions, in order to avoid those disagreeable and unnatural shapes, which would be the unavoidable consequence of adhering too closely to them on all occasions."

every respect, except where he allows, and seems to think it necessary, to swerve from the strictness of mathematical exactness. But, as in the end will be clearly perceived, his ideas in this respect are founded upon false principles: though nothing is more certain, than that a distortion of parts will appear when the eye is placed too near to one part of the subject, the other of course receding and lessening, in a proportion always varying according to the distance of the station. For example, we will suppose a figure reposing on a sofa, and some one about to make a sketch placed almost close to his feet. If the proportions of the head and feet be compared, it will be found *practically*, and without the least reference to rules, that the disproportions are quite as alarming, or more so, than any which might take

take place in the perspectively constructed picture, as imagined by the writer above quoted. Yet no artist could ever think of choosing such a position from which to sketch a figure; a position that would make the feet appear three or four times the length of the head: but, on the contrary, would place himself at a sufficient distance to prevent those extraordinary distortions which a bad choice of place will invariably give. In fact, this whole question is resolvable simply into choice of position; and it never can be conceded to falsify mathematical truth, in order to cover the mistakes of those, whose duty it is to obviate difficulties by legitimate means, rather than in such a manner to sap the first principles of science. A collection of figures in a picture might appear disproportioned, either wholly or in parts, if seen only

only in outline, by one not sufficiently aware of the powers of perspective to make the proper allowances; but let those outlines be filled up with colouring, &c. in exact conformity to the principles of aerial perspective, and let the eye of the spectator be fixed at the precise station from whence the whole was drawn, and all these seeming distortions would be no longer such, but the verisimilitude would be established in the mind, by that same unconscious judgment that sees a cathedral in the distance like a speck, and a cabin on the fore-ground occupying a space in our vision a thousand times greater, yet knows the immensely larger dimensions of the distant speck by laws not necessary here to elucidate, but which practically every one is master of.

The inconvenience sought to be remedied

by

by this attempt to mix up truth and error is, that different persons cannot look at the same picture at the same time, and see it *correctly* representing to all of them, that which it professes to represent. This we may venture to admit at once, if we go to perfect strictness, as absolutely impossible where *solid body* is represented upon *flat surface*; but the student in perspective must not be perplexed on this account, for although he cannot have an absolutely perfect representation for more than one spectator at a time, he has the same consolation which a mathematician has in regard to the impossibility of squaring the circle, &c., the indefinite approximation to the truth, which leaves error so minute, as to be entirely beyond the reach of the most acute perception of the human senses. This approach to truth is to be gained by a longer

distance between the station and picture; and though it will be perfect only to one spectator, yet others may view it at the same time and not feel the error occasioned by a short distance, either to the right or left, from the exact point of view.

Thus it is evident, that there is nothing startling or distorted in perspective but in its exaggerated state; and when it is considered that our sight is a perspective instrument, by which we see all objects perspectively, and in no other manner, we cannot but be reconciled to the strictest laws of that science, which explain to us the governing principles of a sense that affords the purest and least alloyed of all our enjoyments.

AERIAL PERSPECTIVE, &c.

It is surprising how few of the writers on perspective have mentioned the words aerial perspective, as if they had no connexion with the subject, and yet this is the most interesting division of the science. Lineal perspective goes no farther than to correct an outline; but much remains to be done, depending upon a skilful combination of the aerial with lineal perspective, before a picture can be pronounced finished.

By a careful attention to aerial perspective, we may be always certain of making a pleasing picture, if not of succeeding in some of

those striking appearances that seem to have destroyed all rule: yet these appearances or effects, in their wildest moods, are subject to laws of their own, controlled again by the superior regulations of aerial perspective.

This division of perspective enables the draughtsman to represent on a plane surface the various distances of objects from each other, and by a suitable gradation of lights, of shadows, and of colours, to give to mountains, rivers, trees, &c. a seeming magnitude very much superior to their real size in the painting, and to make them seem placed at any wished-for distance or proximity, by throwing over them a degree of air tint, equivalent to the column of air between the spectator and the objects depicted.

Although we know that a pure atmosphere is perfectly transparent and colourless, yet there

there are so many vapours rising continually from the surface of the earth and waters, that all things when removed to a very small distance from the eye, become more or less tinged by them. These vapours most generally have a blueish-grey tint. Of course, objects which are most remote having the greatest interposing column of air, will lose most of their force: that is to say, their lights will become reduced, their shadows considerably weakened, and their colours altogether, or very nearly, blended into one mass of blue or grey, so closely resembling the hue of the sky, or clouds, as scarcely to be distinguishable. At times, in bright sunny weather with occasional showers of rain, the distances are so well made out, both by lights, shades, and local colours, that they will frequently appear (particularly in mountainous districts)

districts) to have made a great approach towards the foreground; yet in this case, under every favourable circumstance of light and shadow, there will operate a sufficient quantity of air tint to set them precisely in the different distances at which they may be placed: and it is by this perfect adjustment of aerial to lineal perspective, so well understood by Claude Lorraine and many others, that a faithful representation of the scenery and exquisite effects of nature is to be expected.

The practice of drawing from nature is here indispensable to the student. His previous knowledge will receive rapid additions, and he will have an opportunity of seeing arrangements and combinations of aerial and lineal perspective, as well as of lights, shadows, and colours, that remain perhaps but

for

for a few moments, yet which, during those moments may convey volumes of instruction.

We will suppose the student about to sketch a view from nature: the subject, a landscape with ruins, &c. The outline must be made correct before any thought is bestowed on the effect or colour. If the weather-stains, shrubs, &c. occur on portions of the ruin standing at different distances, we must carefully mark these distances by a due proportioning of similar objects to each other. For example, the weather-stains produced by rain falling from the sills of two windows of the same size, must necessarily be reduced in a degree proportionate to the perspective reduction of the farthest window; and again, beneath a row of windows standing on a plane at an angle with the picture, an equal number of stains may be visible, not all perhaps

haps of one length, but so nearly as to make it requisite to attend to the perspective of their terminations, that it may be seen how much nearer to the horizontal line those terminations have approached than the windows from which they take their origin. When there are fallen masses of stones or detached blocks, every mass, if quadrangular, will have at least three vanishing points to be noticed, one for the upper surface, and two others for the two sides nearest to the eye. Should the mass be irregular, and composed of regularly wrought stones with portions of mouldings upon them, attention to an endless number of vanishing points would be required to work the whole mass according to rule. But would it be worth the labour? Certainly not. It would be much better to sketch the mass freely, with a regard to all the tendencies of the

principal

principal lines; and very particularly should it be any where near or upon the fore-ground, on account of its increased magnitude.

A road or well-drawn path leads the mind agreeably into the subject by easy gradations, and where the perspective has been well adjusted, and every object upon it properly diminished according to their distance from the front, the effect is always pleasing. A road is of more value in a picture than a river, because it is more frequently from roads, than upon rivers that our views and impressions of nature are derived. A road admits of a thousand picturesque irregularities of which a river is incapable. The formation of wheel-ruts, the horse-track in the middle, patches of vegetation, the ever-changing tints of the soil, the chequered lights and shadows thrown by neigh-

neighbouring trees and bushes, besides the power of introducing an almost infinite variety of figures, give to the accurate draughtsman an opportunity for embellishment and finish in the perspective department, which a river with all its moving objects (although very beautiful) will not allow. The student should be diligent in examining the different appearances made by roads upon surfaces that are dissimilar. A winding road on the side of a hill is very unlike the same on a level plain; and when a road takes its way directly up a steep ground in front, the width at the top will not be very much less than at the bottom, not having receded from the spectator perhaps more than half the distance it would have done upon level ground, or much less in very abrupt ascents. (Plate XVII. fig. 1.)

It might be supposed, amidst wild plants and creepers that shoot among the ruins, the rules of perspective would be lost; yet here, as in every other place, their violation would bear ample testimony to the unskilfulness of the draughtsman. When plants are upon a level with the eye, we see a regular intermixture of branches and leaves. When below the horizontal line, little more than the upper surfaces of the leaves are seen; but when above, we not only perceive the greater part of their branches, but in addition, roots starting off the wall in every possible deviation from order and regularity. These three different positions have certain appearances that can only be well understood by frequent observation, as there is method to be found in all this irregularity, arising out of the laws of perspective. Attention must be paid

to

to the proper diminution of the leaves as well as of the branches and roots, whose curves and angles are to be formed with nicety at the points where they take place. The student should also notice, that the trees have their trunks well diminished upwards, and that their branches receive not only their natural decrease as they leave the chief trunk, but also the perspective decrease occasioned by their distance from the eye. This, with attention also to the aerial perpective, *viz.* by giving the greatest power of light, shade, and colour to the nearest branches and clusters of leaves, and adding a proper quantity of air-tint to those which are at the back, will do much towards giving apparent magnitude: one of the most desirable properties that front objects can possess next to the fidelity of the detail.

Landscapes

Landscapes seldom look well without figures. If we suppose them to be placed with the draughtsman upon a plain perfectly level, and the artist upon his feet whilst making his sketch, the heads of all those figures which are also standing, and of his own height, will have their heads upon the horizontal line; those which are shorter than the person sketching, below; and those that are taller, of course, above his horizon; making it needful that the diminution in height occasioned by their different distances should be made at the feet only of those figures whose heads fall upon the horizontal line.* But should we suppose the student to be seated during the sketch, the head of every full-grown erect figure will appear above him: in this case, the figures will have to

* Plate XVII. Fig. 4.

to be shortened at the head as well as at the feet. The rate of diminution is ascertained by drawing a line from the head and feet of the nearest figure to the point of sight: these two lines will limit the perspective gradation of size for figures of the same height as the one from which the lines originate. This mode will serve equally for cattle, &c.; and one process will answer for the whole picture, by recollecting that figures, &c. which are of equal heights in the originals, are to be made of similar heights at the same distance from the fore-ground, whether they may be placed to the right or left of the centre of the picture.

When proper proportions have been given to the figures in the sketch, their colours, &c. may be introduced. Should the student by a little inattention to the aerial department make a small distant figure too prominent in

effect

effect for the objects around, it will stand forward in the picture, not as a figure of natural size, but rather as a dwarf, when viewed with regard to objects at the same distance which may be true in colouring and effect for their situations.

Nothing more promptly shews a wrong effect than a figure out of harmony with the rest of the picture, for it may, by having too much air-tint thrown over it, take the appearance of a ghost, or by receiving too little look like a fairy springing from the paper.

Few things add more to the beauty of a composition than reflections in water; for as pure water, like the atmosphere, has no colour of its own, it becomes when tranquil, a mirror to every surrounding object. Regard must be had to the aerial perspective, colours, &c. when reflected in water, with as much attention

tion to their distances as to the colours, &c. of the original objects which give the reflections. When there exists the slightest undulation or ripple, a large admixture of the tints of the sky takes place throughout the whole, weakening the power of reflection, and gently blending all things together, by a magical play and mixture of lights, colours, shades, and forms.

When objects are reflected in still water, the depth of the reflection will be precisely equal to the height of the object reflected, if it be in contact with the water. For example, a post standing in water will reflect a length equal to its height above it; or an arch, making a true semicircle in spanning a rivulet, will with its reflection become an entire circle. (Plate XVII. fig. 2.)

In

In a series of objects placed behind each other, as mountains, trees, &c., we may, for the reflection of every mountain or other objects, suppose the water carried on its own level to the central base of the mountain, and from this division of the mountain and water lay down its whole height for the reflection. Thus, as the plane of the water would be constantly retiring in order to arrive at the central base of each receding mountain, these lines of demarcation would each stand a little higher on the picture as the distances of the mountains increased, and the reflections of their summits would appear arranged invertedly of very different relative depths, when compared with the heights of the real mountains as seen against the sky. (Plate XVII., fig. 3.)

The large weeds that generally approach

closely to the front of a picture should not be neglected Among these there is great room for the display of perspective knowledge in some of its most agreeable forms. Suppose the burdock, the more humble coltsfoot, or any other plant whose leaves are of sufficient size to bear characterizing: many of them are strongly marked by the fibre that proceeds from the footstalk through the middle to the point of the leaf, with numerous smaller fibres resembling veins radiating from the centre to its outer edges. When such leaves are lying on the ground in an horizontal position and not far from us, our first care will be to mark the central division or fibre in its proper place, *viz.* not in the middle of each leaf, but so situated that the nearer half of the leaf shall be made larger than the farthest;

farthest; for the rule, that all things appear to diminish by distance, is to be regarded down to a blade of grass, when brought near enough to distinguish its component parts. The outer curvature of the two sides forming the complete circuit, the direction of the lateral veins or rays, and the varieties in these forms occasioned by their unequal and undulating surfaces, with all their different attitudes, are to be diligently noted by a close attention to nature; for nature only can teach the high finish, and delicacy, in the construction of those ever-changing and elegant forms, of which the most elaborate perspective diagrams constitute little more than first lines.

Although some of the barren wastes and moors of Great Britain abound in scenes of

of a most unpromising kind, they will, at certain seasons and under favourable modifications of light and shadow, afford landscapes of a peculiarly picturesque description. Frequently we see on these extensive tracts warm or silvery lights diminishing into shade and again suddenly breaking out, in the form of a brilliant ray from some sequestered nook. Often a wreath of smoke floating along the sides of a hill, produced from the cottage of a solitary homestead, planted upon some small spot of greensward like an oasis in the desert; a single patch of corn with a few aged and stunted trees, or perhaps a hay-stack, marking by its diminutive size, the scanty soil from which it has been gathered, will give an appearance of picturesque comfort by the contrast of surrounding sterility. Cattle placed in a vivid light, relieved

by

by the sombre hue of the distant heath in shadow, or the effect reversed, make in such scenery very interesting accompaniments. Nearer at hand we see more distinctly broken ground interspersed with tufts of vegetation, gravel, or pieces of rock stained with moss and lichens, rising abruptly from the heath, or gently sinking into it amidst all the profusion of nature's wildest beauties; fern, harebells, the briar rose, the furze, and purple thyme; added to these we often find still pools of water and all the variety of aquatic plants, with the plover, heron, widgeon, or duck wheeling in the air or resting on banks of yellow sand, altogether forming a multitude of objects so diversified, that under the harmonizing tints of autumn a painter would require little else for a picture.

This

The effect of such pictures is dependent on the due arrangement of the aerial perspective: for we are aware by long habit, how many gradations appear in such scenery, very often defined by no other means than the shadows of clouds, scattered over the country at varied intervals, with degrees of intensity changing according to their different distances from the front, and yet which are generally adequate to the purpose of informing us of the nature of the ground, by shewing the ascents and depressions of its surface; but if to these be joined the accompanying lights, shadows, and colours produced by the forms and qualities of the soil, or vegetation, aided also by a sky perspectively adapted to the subject, combinations may be created of such infinite extent, that to the student who has diligently cultivated the art,

means

means are afforded of making sometimes a very pleasing picture out of what has apparently little or no material to work upon. In short, nothing should be considered beneath the attention of the student, or escape his notice.* Practice in drawing will increase the power of vision, and give to him a habit of seeing more acutely and with greater precision than most others; for it is of consequence to him to regard all things minutely, and with unceasing observation, otherwise he can never be enabled to perceive many of those faint, but beautiful alternations of light and shadow, sometimes impressing the face of nature like a passing thought, which scarcely moves the brow or curves the lip, and yet will give, during its rapid course through the mind, an intelligence to

* Quam multa vident pictores in umbris, et in eminentiâ, quæ nos non videmus.—CICERO.

to the countenance, understood but indescribable.

These finer effects of aerial perspective cannot be explained by language, and we are thus in a manner compelled to recommend again that mode of practice which is absolutely the best: to study nature closely, with occasional references to the works of the most eminent masters, ancient and modern, and through such means to form a style, by which we may most suitably express our ideas.

THE END.

LONDON:
J. L. Cox, Printer, Great Queen Street,
Lincoln's-Inn Fields.